EU Railway Policy on International Corridors for Rail Freight: Example of the Orient/East-Med Rail Freight Corridor No. 7

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9 EU RAILWAY POLICY ON INTERNATIONAL CORRIDORS FOR RAIL FREIGHT: EXAMPLE OF THE ORIENT/ EAST-MED RAIL FREIGHT CORRIDOR NO. 7

Resume

Abstract
The Orient/East-Med Corridor, connecting central and southeastern Europe, provides important business potential for European rail freight. However, freight transport by rail faces a number of challenges in terms of quality, cost competitiveness, service features and political/societal acceptance and support. A particular challenge is the slow implementation of a truly Single European Rail Area, leading to high costs and time losses at borders. As a response to this, so-called EU Rail Freight Corridors (RFCs) have been set up, one of them being the Orient/East-Med RFC No. 7, established in November 2013 and aiming at better cross-border coordination and cooperation in the field of infrastructure and traffic management and improved customer orientation and involvement of corridor users. Key features of the Rail Freight Corridors are strong governance structures with clearly defined tasks. Among the early positive effects are the elaboration and testing of new solutions for cross-border processes, better coordination in timetable planning and the setting up of cross-border working groups, bringing relevant actors together to address specific issues. At the same time there is room for further improvement both conceptually and in terms of the corridor geography. The establishment of two further Rail Freight Corridors in the region, the Alpine-Western Balkan RFC No. 10 and the Amber RFC No. 11 closes some remaining gaps in the network of corridors.

Keywords
Rail freight – european corridors –transport policy – TEN-T – infrastructure management – traffic management – Southeastern Europe

Die europäische Schienenverkehrsstrategie für internationale Korridore: das Beispiel des Orient/East-Med-Schienengüterverkehrskorridors Nr. 7

Kurzfassung
Im Orient/East-Med Corridor, der Mittel- und Südosteuropa verbindet, steckt ein wichtiges kommerzielles Potenzial für den europäischen Schienengüterverkehr. Der Schienengüterverkehr in Europa steht jedoch vor einer Reihe von Herausforderungen in Bezug auf Qualität, Kostenwettbewerbsfähigkeit, Leistungsmerkmale sowie politische/gesellschaftliche Akzeptanz und Unterstützung. Eine besondere Herausforderung ist die nur schleppende Umsetzung eines wirklich einheitlichen europäischen Eisenbahnraums, was zu hohen Kosten und Zeitverlusten an den Grenzen führt. Als Reaktion hierauf wurden sogenannte EU Schienengüterverkehrskorridore (Rail Freight Corridors = RFCs) geschaffen, darunter der im November 2013 eingerichtete Orient/East-Med RFC Nr. 7, der auf eine bessere grenzüberschreitende Koordination und Zusammenarbeit im Bereich Infrastruktur und Verkehrsmanagement sowie eine verbesserte Kundenorientierung und Einbindung der Nutzer der Korridore abzielt. Hauptmerkmale der Schienengüterverkehrskorridore sind effektive Verwaltungsstrukturen mit klar definierten Aufgaben. Zu den bereits feststellbaren positiven Effekten gehören die Erarbeitung und Erprobung neuer Lösungen für grenzüberschreitende Prozesse, eine bessere Koordinierung der Fahrpläne und die Einrichtung von grenzüberschreitenden Arbeitsgruppen, die relevante Akteure an einen Tisch bringen, um spezifische Probleme anzugehen. Gleichzeitig gibt es sowohl konzeptionell als auch in Bezug auf die Geographie der Korridore Raum für weitere Verbesserungen. Die Einrichtung von zwei weiteren Schienengüterverkehrskorridoren in der Region, dem Alpine-Western Balkan RFC No. 10 und dem Amber RFC No. 11, schließt einige verbleibende Lücken im Korridornetz.

Schlüsselwörter
Schienengüterverkehr – europäische Korridore – Verkehrspolitik – TEN-V –Infrastrukturmanagement – Verkehrsmanagement – Südosteuropa

1 Challenges for rail freight in Europe and in the Orient/East-Med Corridor

Rail freight in Europe is facing a number of challenges which need to be addressed if rail wants to maintain and strengthen its competitiveness on the transport market. The main challenges (Troche 2018), which are also relevant for the Orient/East-Med Corridor, are the following:

A quality challenge

The quality and reliability of rail freight services, not least in terms of punctuality, are today in many cases still insufficient, in particular in international traffic. Remarkable improvements have certainly been made in specific traffics and transport lanes, especially in the trainload and intermodal market segments, but these 'good examples' are still too much an exception rather than the rule, and good quality in rail freight services is not always stable over longer periods of time. The lack of quality and reliability

has a twofold impact: it hinders rail from meeting customer expectations – leading to low customer satisfaction and lost business opportunities – but also leads to higher costs, since staff and asset utilization declines, and there is a need to provide back-up resources in the form of drivers, locomotives and wagons and a need for extensive ad hoc-planning.

Quality problems are indeed a severe challenge on the Orient/East-Med Corridor, especially for train services over longer distances. In spite of generous timetable margins of up to almost a full day, for example on the route between Svilengrad at the Bulgarian-Turkish border and Sopron at the Hungarian-Austrian border, train services are still facing frequent and severe delays, which in the past has repeatedly led to the cancellation of services and transfer to other modes and/or routes, in particular to ferry routes between the northern Adriatic ports (primarily Trieste) and Greek and Turkish ports.

A further aspect of quality is major traffic disruptions on important freight routes in Europe. Several incidents during recent years highlight the importance of taking the aspects of robustness and resilience in the event of major traffic disruptions more into account in order to ensure a good and constant quality in rail freight; the need for diversionary routes of reasonable standard and capacity should be particularly mentioned in this context.

Again, this is a particular challenge for the Orient/East-Med Corridor with a view to the lower density of the rail network mainly in the southern part of the corridor, where often the only possibility would be to divert traffic over long distances, involving routes and countries that are not part of the corridor.

A cost challenge

Costs have been, are and realistically will remain a very important factor for the choice of a transport solution. If rail wants to remain competitive (and ideally improve its competitiveness), irrespective whether in an all-rail transport solution or as part of an intermodal transport chain, it has to address this challenge. The cost efficiency of a transport solution is usually measured in costs per net ton-kilometer. An effective way to strengthen the cost competitiveness of rail is to realize economies of scale, by moving more payload (tons or cubic-meters) per wagon and per wagon meter, by moving more wagons per train – i.e. longer and/or heavier trains – and by handling more trains on the rail network. While over several decades other transport modes have made huge progress in strengthening their economies of scale – one important factor explaining their success – rail is lagging behind and needs to improve. International transport is particularly concerned, since the weakest link of a transport route often defines the efficiency over the entire transport distance – and the longer the transport route, the bigger the likelihood of 'hitting' a weak link. Since cross-border links were often neglected and were not usually an investment priority in national infrastructure planning, many international rail transport routes for freight are affected. Slow progress in the harmonization of processes and operational rules across borders, including language issues, is aggravating the problem.

The situation on the Orient/East-Med Corridor illustrates all these problems very well. Major parts of the central section of the corridor through Hungary and Romania are, for example, limited to 20t axle-load (compared to the usual 22.5t in Europe), the weakest links on the lines to both Greece and to the Turkish border do not allow more than 550-m-long trains (compared to the target value of 740m, which also is achieved on certain parts of the corridor) and there are still short, but very persistent, electrification gaps between Romania and Bulgaria (Orient/East-Med RFC No. 7, Interactive Map tool), requiring a change of traction two times within relatively short distances. Local improvements have been made, such as a new cross-border bridge across the Danube between Vidin and Calafat, but cannot be capitalized upon due to a lack of continuity of infrastructure standards, as in the given example where the approaching lines on both sides have not been upgraded and such upgrades are not in view in the short term.

A service challenge

The changes and increasing diversification in the transport market in terms of goods structure result in increasingly specific logistical demands for different traffics. A trend from non- or low-processed base goods to highly processed goods in an advanced stage of the production chain increases the demand for specific service characteristics. An example is the need for temperature-controlled transport, where rail today is often unable to provide service features comparable to those of road or air transport. Another example is highly time-sensitive goods, requiring fast and precise delivery. Another dimension of service is the ability to develop and implement transport solutions at short notice independently from fixed timetable periods. Also, accessibility to rail freight services, both in geographical terms as well as in terms of easiness of use, can be seen as a dimension of the service challenge. This includes, for example, response time to customer enquiries, the availability, accessibility and efficiency of access points to the rail freight system (last-mile infrastructure and related services) and the provision of information before, during and after the execution of a transport, such as information about the Estimated Time of Arrival (ETA). Here it is important to note that the response time to customers is in turn heavily influenced by response times between different actors of the rail sector, e.g. between infrastructure managers and railway undertakings in connection with capacity requests. Adding new features to the service portfolio of rail – both towards the 'final customers', i.e. the shippers, as well as internally between railway market actors – and speeding up internal and external business processes, e.g. through digitalization, will be crucial to enable rail to respond to changing logistical market demands and to enter into new – or previously lost – market segments. This will be necessary if rail is to grow its modal share. In a broader perspective, better coordination of traffic and spatial planning is important, where in particular rail freight needs to be better taken into account.

While the above aspects are to varying degrees generally true for rail freight in Europe, there is one specific aspect which affects the Orient/East-Med Corridor more than others: the lack of intermodal infrastructure in the form of modern, efficient intermodal terminals in southeastern Europe. In large parts of central, northern and western Europe a dense network of intermodal terminals has evolved over the past decades, fueled by dedicated funding programs on European and national level and often strong support on regional level, possibly even leading to a risk of 'over-estab-

lishment' of terminals (Bergkvist/Wilmsmeier/Cullinan 2016: 24) and cannibalization effects between neighboring terminals (Macharis/Pekin/Caris et al. 2008: 99). In contrast, very few intermodal terminals exist in southeastern Europe and those which exist often have outdated infrastructure and handling equipment. Even more cumbersome is that even some of the (few) newer or modernized terminals are not always in line with pending standards in rail freight, e.g. with regard to train lengths. There is a hen-and-egg-problem here. The, often, low standard of the rail network and slow progress in its modernization does not encourage terminal owners to invest in a standard which they cannot capitalize upon in the near future, while the low standard of terminals may, in the longer term, cause problems in fully reaping the benefits of improvements to the rail network.

A political and societal challenge

Not least due to its good environmental performance, but also due to high safety, rail as a transport mode generally enjoys a good reputation and high political and societal acceptance. Nonetheless, there are issues which need to be addressed in order to maintain this acceptance in the future. In the field of rail freight a particular concern is rail noise. Technical measures are currently under implementation, both trackside and on the vehicles, which will lead to a substantial reduction in noise from freight trains in the coming years. This is important in order to avoid possible future restrictions on the operation of freight trains, which could lead to an undesired shift from rail to road, aggravating instead the problems of noise (as well as other environmental problems) from road transport. Another societal challenge is an ageing population in combination with high levels of retirements among the rail workforce. It is therefore important to increase the attractiveness of jobs in rail freight operations and to make use of the opportunities from digitalization and automation of processes in rail freight.

A problem affecting rail in many central and southeastern European countries – and this means also affecting the Orient/East-Med Corridor – is that the above statement about the good reputation of rail is only to a limited extent true for these countries. Both political decision-makers as well as the general public often consider rail as an outdated, old-fashioned mode of transport from the 'communist era', leading to strong political and public pressure to prioritize investments in the road system. If improvements of the rail system are taking place, these are often targeted at passenger traffic rather than freight. Often these improvements are also relatively modest; the introduction of high-speed passenger services, acting as a game-changer in the public perception of rail in many other countries, is still largely absent in many countries along the Orient/East-Med Corridor.

A European challenge

More than 50% of European rail freight (measured in ton-kilometers) is cross-border and this share tends to increase. This trend is fueled by the globalization of goods production and consumption, leading to both more complex and longer supply chains. Generally, rail's competitiveness increases with distance; distance allows rail to compensate for higher costs at the ends of the transport chain. However, this advantage, which rail should have over long distances, is in Europe often reduced – if not eliminated –by a lack of interoperability at national borders, since in the rail system these borders are almost always also 'system borders' with regard to technical, operational,

regulatory and managerial aspects. Often market share and competitiveness in national traffic is higher than in international traffic and declines as the number of borders to be crossed increases (Fig. 1). The objective must therefore be to create a truly Single European Rail Area, eliminating cost-driving system borders as much as possible; this concerns both the hardware, i. e. technical interoperability, as well as soft factors in the form of technical, operational and administrative rules and processes.

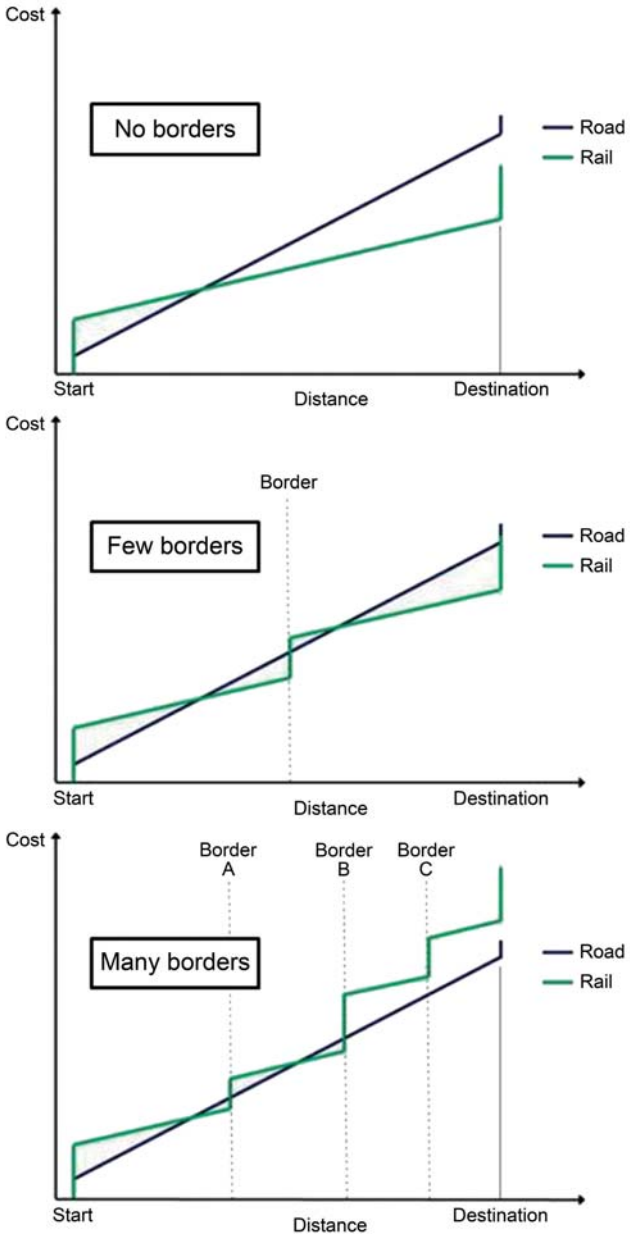

Fig. 1: The impact of borders on the competitiveness of rail in freight transport / Source: Author

In the freight business we can note two, to a certain degree diverging trends since the beginning of the 1990s. When it comes to train operations, we can in fact see an increasingly 'European' approach by the market actors directly involved, i.e. mainly railway undertakings (freight train operators), but also intermodal operators. Both incumbents and new entrants operate in open access, often with their own resources – locomotives and drivers – across borders. There is clearly increased commercial orientation towards customers.

At the same time infrastructure and traffic management continued (and still continues) to follow a rather national approach. This can be explained by a number of factors:

> The functions are in the hands of public national infrastructure managers.

> Railway networks are natural monopolies and consequently there are no market incentives for the infrastructure managers to improve customer orientation.

> The main user of European rail networks is, with few exceptions, passenger traffic. Thus, infrastructure managers tend to focus on this market segment, also because passenger traffic usually receives higher public and political attention ('freight does not vote').

> Railway infrastructure is usually publicly financed and is strongly oriented towards national policy objectives and political considerations.

Regarding the countries of the Orient/East-Med Corridor, a positive aspect is that there are quite a number of new (even private) stakeholders active in the rail freight market. This shows that there are market actors who still see prospects for developing business in the rail freight market in this region of Europe.

2 European Union (EU) rail freight policy

The European Commission laid down key policy objectives of European transport policy in its White Paper on Transport (EC 2011a). An overarching objective is to contribute to a reduction of Greenhouse Gas Emissions (GHG) by 60% until 2050 by strengthening the participation of rail and waterborne transport in the transport market.

The prominent role of rail in EU transport policy is concretized in the objective to shift 30% of long-distance road freight (>300km) to more energy-efficient modes of transport by 2030, increasing this figure to 50% by 2050. Since the waterway network is less dense than the rail network and in view of logistical requirements, in many cases this means a shift to rail; consequently, rail freight ton-kilometers on the European network are expected to increase by 87% compared to 2005.

EU transport policy underlines the importance of integrating transport modes. For the rail freight system, connections with maritime transport play a central role, reflecting the increasing role of rail in the hinterland traffic of most major European

seaports. Therefore, proper connections of all core network seaports to the European rail system is a further objective of the White Paper. The Orient/East-Med RFC connects several seaports, both on the Black Sea, the Aegean Sea and at its northern end even at the North Sea and Baltic Sea.

The EU rail policy is based on two 'pillars' – a market pillar and a technical pillar (EC 2016a). The market pillar aims at market opening and better governance of the railway system, while the technical pillar aims at technical harmonization across borders and simplified procedures for railway undertakings wishing to operate across Europe, while ensuring the safety of the railway system, with the objective of reducing the administrative burden and costs in particular for traffic crossing borders. The rail freight market has been gradually opened in the EU since 2003 and has been entirely open since 2007. On the technical side the deployment of a harmonized European Rail Traffic Management System (ERTMS) is a cornerstone for technical harmonization in the European railway system and another key objective of the White Paper.

The ultimate goal of EU railway policy is to create a truly Single European Rail Area (SERA), which would largely eliminate national borders for the market actors and users of the European railway system (Fig. 2). When fully implemented, a Single European Rail Area would create a harmonized railway market with a rail network of continental dimensions, which should enable rail to fully exploit its competitive system advantages when it comes to transport over long distances.

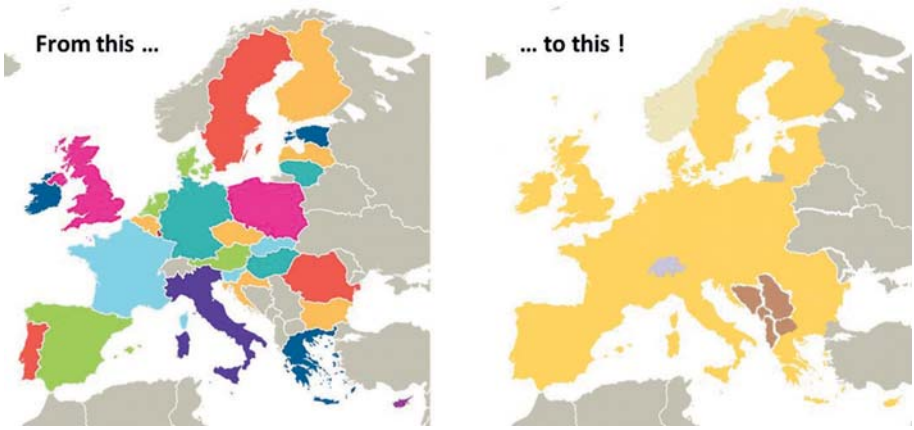

Fig. 2: The idea of the Single European Rail Area. With the gradual accession of countries in the Western Balkans to the EU these will become subject to European law and thus become part of the Single European Rail Area / Source: EC 2017a: 4

In order to strengthen the concept of the Single European Rail Area, speeding up its implementation and reflecting the urgent need for improvements in cross-border traffic, the EU Commission has initiated a concept of international Rail Freight Corri-

dors (RFCs), to be established along key routes for European rail freight and aimed at fostering co-operation between the national railway infrastructure managers and between Member States along these corridors. The RFCs are based on an EU Regulation (Regulation (EU) 913/2010). The White Paper on Transport defines these RFCs as a backbone of the European freight transport system. The Orient/East-Med Rail Freight Corridor No. 7 (RFC OEM) is one of these RFCs. In the following two sections the concept of the RFCs and the example of the RFC OEM will be described in more detail.

The EU rail policy is complemented by an infrastructure policy in the form of the Trans-European Networks for Transport (TEN-T) and with the Connecting Europe Facility (CEF) and the structural funds as financing instruments.

The importance of rail freight in the TEN-T policy is reflected by the fact that a dedicated Core Network for freight, covering the main railway lines for freight transport, has been defined in the TEN-T Regulation. Article 39(2a) also sets binding minimum infrastructure standards to be implemented on this network by 2030 (Regulation (EU) 1315/2013):

> 740 m train length

> 22.5 t axle-load

> 100 km/h line speed

> ERTMS

> Electrification

While the target values may appear moderate in comparison to technical possibilities and the standards of other large railway systems in the world where much longer and heavier freight trains already operate today, they nonetheless constitute an improvement compared to today in many parts of Europe (in particular regarding the train length requirement). Their inclusion in an EU Regulation has to be considered as a historic breakthrough insofar as it means that this Regulation for the first time defines with binding, legal force a minimum infrastructure standard for a coherent European rail network to be achieved by a concrete deadline.[1]

Within the TEN-T policy a number of Core Network Corridors (CNCs) have been defined as an instrument to implement the Core Network (Regulation (EU) 1316/2010). These CNCs are geographically largely aligned with the Rail Freight Corridors.

1 The Technical Specifications for Interoperability (TSIs) define much more comprehensive minimum requirements, but only apply in cases of new construction or modernization and thus do not set a deadline for their fulfillment in a coherent network.

3 Concept of the EU Rail Freight Corridors

The EU Rail Freight Corridors are a key initiative of the European Commission to achieve a truly Single European Rail Area for rail freight. The general objective of the RFC concept is to foster co-operation across borders both at the level of Member States and rail infrastructure managers and to strengthen the involvement of users in the development of the European rail freight system. The RFC concept aims at providing capacity of good quality for international freight trains by offering dedicated capacity (train paths), coordinating capacity planning, traffic and infrastructure management and setting up Corridor One-Stop-Shops (C-OSSs) as single contact points for the customers. The involvement of users is strengthened by the setting up of Advisory Groups for railway undertakings and terminals, by consultation procedures and by regular customer satisfaction surveys (EC 2011b).

The RFCs are based on above-mentioned Regulation (EU) 913/2010 concerning a European rail network for competitive freight, which entered into force on 9 November 2010. It defines nine initial RFCs, of which six had to be established by November 2013 and the remaining three by November 2015.

Regulation (EU) 1316/2013 establishing the Connecting Europe Facility slightly amended the Principal Routes of the initial RFCs in order to ensure a better alignment between RFCs and the Core Network Corridors (CNCs) defined under the TEN-T policy. In addition, geographical names were given to the RFCs, while before they had been referred to by numbers (RFC No. 1–9); RFC No. 7 became as a consequence the Orient/East-Med Rail Freight Corridor.[2] It should, however, be noted that the geographical alignment of RFCs and CNCs is not exactly identical, since the CNCs by definition only comprise lines belonging to the Core Network, while the RFCs are described in the Regulation only by a Principal Route defining certain nodes, but not concrete lines; the lines connecting these nodes are designated by the corridor governance structures based on market needs and may (and de facto do) therefore comprise sections belonging to the TEN-T Core Network, the TEN-T Comprehensive Network as well as – in rare cases – lines outside the TEN-T Network. Thus, there can be other or several parallel lines connecting the nodes listed in the Principal Route. The RFC-Regulation explicitly demands the inclusion of diversionary routes where appropriate. As a consequence, the RFCs have a somewhat broader geographical scope than the CNCs.

The background to having two different corridor concepts is that the purposes of the CNCs and the RFCs are certainly complementary and partly overlapping, but are not identical. The CNCs are primarily an instrument for the implementation of the Core Network, focusing strongly on infrastructure investments, while the RFCs shall provide favorable conditions for international rail freight with help of measures which go far beyond (and do not even primarily focus on) infrastructure investments. Nonetheless, close co-operation between the two corridor concepts is mutually fruitful,

2 In the context of this chapter both the names and numbers of the RFCs are used, since the numbers are still often used in order to refer to an RFC; however, the numbers are no longer formally part of their denomination.

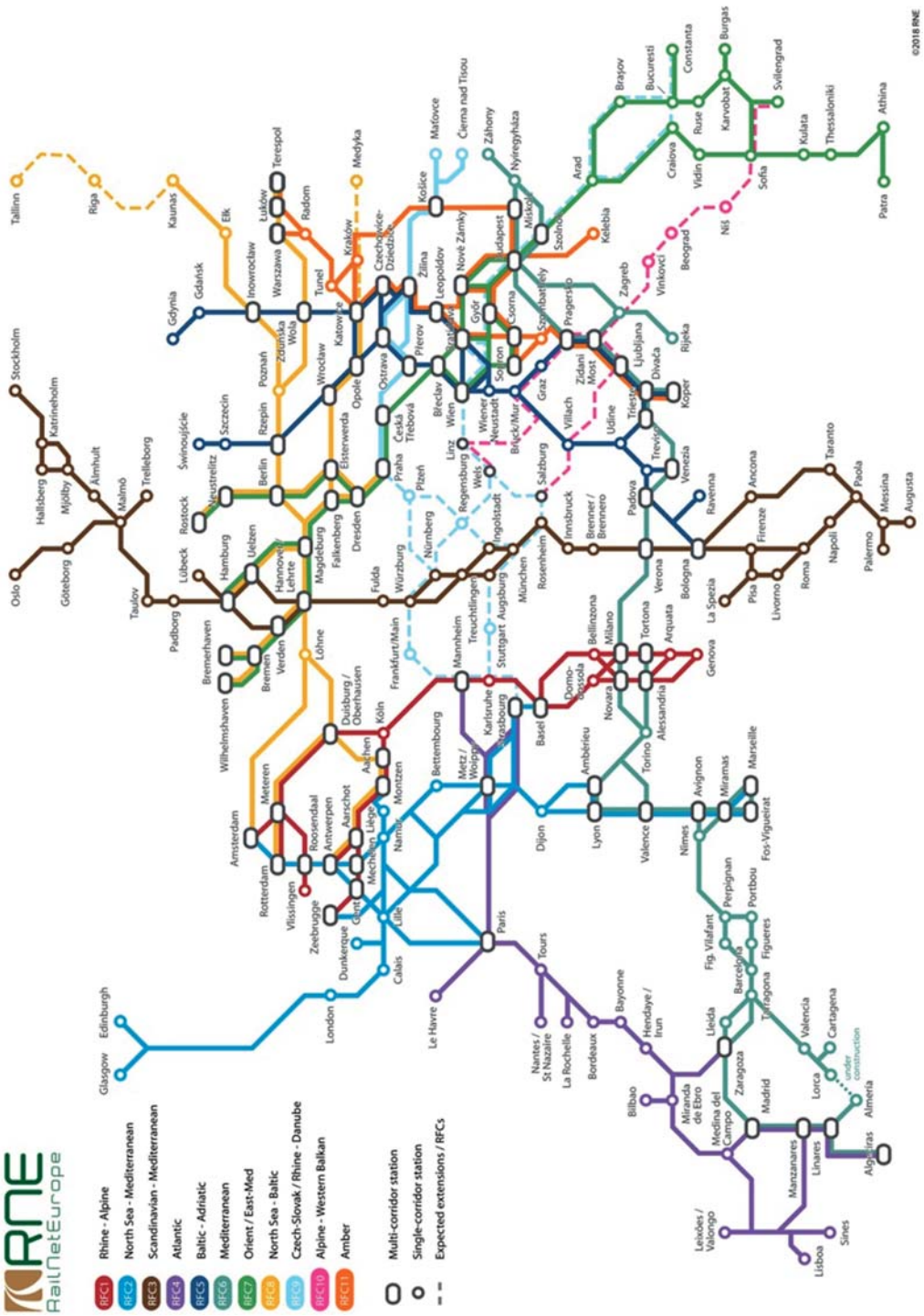

Fig. 3: Map of EU Rail Freight Corridors 2018; the map is for information only and shows the main routes of the corridors; further lines can be designated to a corridor / Source: RailNetEurope 2018

envisaged by law and also de facto taking place – for example through the participation of RFC representatives in the CNC Fora and a frequent exchange between RFCs and the CNC coordinators.

The RFC-Regulation also opened the possibility to establish further RFCs on the initiative of Member States concerned. One further RFC, the Amber RFC No. 11, was launched in January 2017 (CID 2017/177), connecting Slovenia, Hungary, Slovakia and Poland; this corridor became operational in January 2019. A second new RFC, the Alpine-Western Balkan RFC No. 10 (CID 2018/500), connecting Austria via Slovenia, Croatia and Serbia with Bulgaria, is currently also under establishment. Furthermore, the North Sea-Baltic RFC No. 8 was extended to southern Poland and to the Czech Republic in 2015 (CID 2015/1111; CID 2017/178).

The extension of RFCs and establishment of new RFCs not only closes some gaps in the network of RFCs but also demonstrates a strong interest in and support of the concept of the RFCs as such, which has to be seen positively from a policy point of view. Figure 3 gives an overview of the current network of RFCs; it also indicates the two new RFCs, the Amber RFC No. 11 and the Alpine-Western Balkan RFC No. 10.

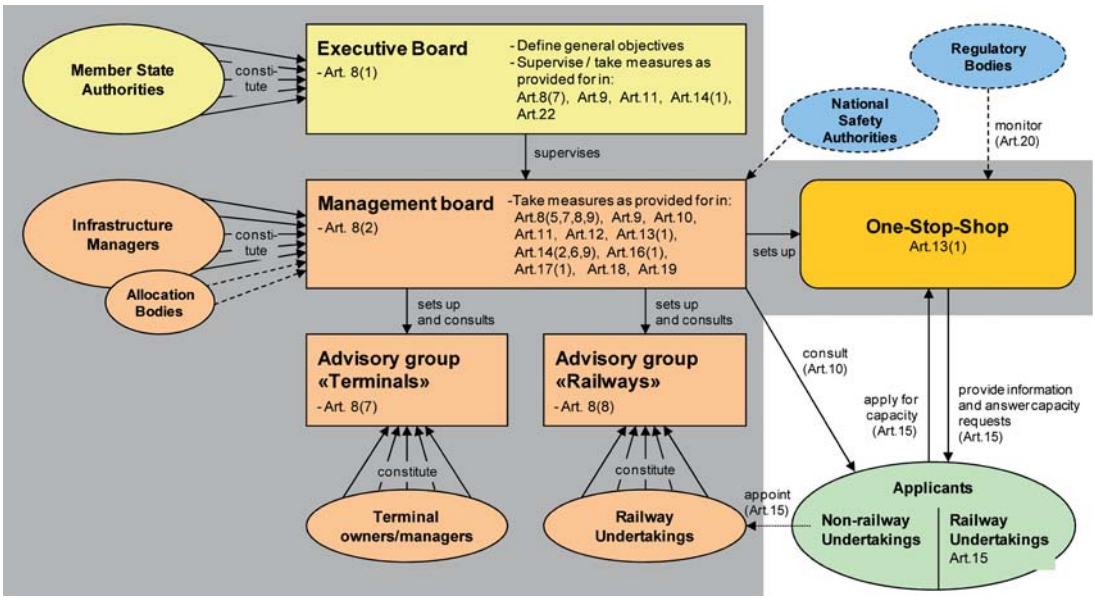

Fig. 4: Governance structure of a Rail Freight Corridor / Source: Author/EU Commission

The RFC-concept draws its strength not least from the fact that the corridors are not just 'mere lines on a map', but that there is a permanent governance structure established for each corridor, consisting of governance bodies with clearly defined tasks and decision powers stemming from a legal basis on EU level. These governance bodies are (Fig. 4):

> An Executive Board, composed of representatives of the authorities of the Member States concerned (usually the ministries in charge of transport)

> A Management Board, composed of the representatives of the infrastructure managers concerned (and, where relevant, the Allocation Bodies)

> An advisory group for railway undertakings interested in the use of the corridor (Railway Advisory Group – RAG)

> An advisory group made up of managers and owners of the terminals of the freight corridor, including, where necessary, ports (Terminal Advisory Group – TAG)

> A Corridor One-Stop-Shop, set up by the Management Board

The main tasks of the Executive Board are to define the general objectives of the corridor, to adopt a framework for capacity allocation, to approve the Implementation Plan and to supervise the work of the Management Board. The Executive Board shall also act as an intermediary and provide an opinion in case of disagreement between the Management Board and the Terminal Advisory Group.

The Management Board takes the main workload of running the freight corridor. It shall draw up and regularly review an Implementation Plan, containing a description of the corridor, the objectives of the corridor and the essential elements of a transport market study, which is to be updated regularly. It shall also consult applicants and set up Railway and Terminal Advisory Groups (RAG, TAG). One of the tasks of the Management Board is also to draw up and regularly review an investment plan, addressing i.a. the removal of bottlenecks and the deployment of interoperable systems, in particular ERTMS. In this context, it is to be noted that six of the RFCs have 'predecessors' in the form of ERTMS-corridors; in order to avoid duplication of structures and work, the RFCs have in these cases taken over and incorporated in their work the roles of the ERTMS-corridors. The Orient/East-Med RFC No. 7 includes the lines of the former ERTMS-corridor 'E'. The Management Board shall also ensure the coordination of works along the corridor, set up a Corridor One-Stop-Shop (C-OSS) as a single contact point for applications for infrastructure capacity, publish pre-defined dedicated capacity for international freight trains in the form of Pre-arranged train Paths (PaPs) and Reserve Capacity (RC), coordinate priority rules, put in place procedures for coordination of traffic management, provide information about the conditions of use of the corridor, including terminals, in a Corridor Information Document and regularly monitor the performance of rail freight on the corridor, and organize customer satisfaction surveys and publish their results. For the purpose of carrying out its tasks, the Management Boards set up (permanent) Working Groups or (temporary) Task Forces.

Both the Executive Board and the Management Board take their respective decisions on the basis of mutual consent. The Advisory Groups (RAG and TAG) are consulted by the Management Board i.a. on the Implementation Plan. Further, the Advisory Groups

may issue opinions on proposals by the Management Board that have consequences for their members and may issue opinions on any issue they consider relevant.

An important element of the RFC-Regulation is the definition of dedicated capacity for international freight trains jointly by the infrastructure managers concerned. The dedicated capacity consists of pre-arranged paths (PaPs), which are published in the month of January preceding the entry into force of the annual timetable in December, and of Reserve Capacity, which is kept available until a time limit not exceeding 60 days (in practice 30 days) before its scheduled time.

The RFC-Regulation does not itself contain any traffic management rules, with one important exception: Art. 17 concerning traffic management in the event of disruption explicitly requires that paths belonging to the dedicated capacity (Pre-arranged Paths, or Reserve Capacity) and allocated to "freight trains which comply with their scheduled time in the working timetable shall not be modified, as far as possible".

The following list summarizes the main tasks of the RFCs, representing the specific objectives of the RFC concept:

> Easy access for users to information about a corridor – Art.18

> Provision of dedicated capacity for international freight (pre-arranged train paths and reserve capacity) – Art.14 (3,5)

> Corridor-One Stop Shop as a single contact point for a smooth and flexible path allocation process – Art.13

> Common quality/punctuality targets – Art.9c

> Cross-border coordination of traffic management – Art.16(1)

> Sufficient priority for freight trains – even in cases of disruption – Art.17

> Integration of terminals in traffic management and infrastructure planning – Art.16(2)

> Coordination of investments – Art.11

> Technical harmonization of infrastructure – Art.11(1c)

> Coordination of maintenance works – Art.12

> Cross-border traffic performance monitoring – Art.19(2)

The EU Rail Freight Corridors form the rail freight backbone of the multimodal Core Network Corridors (CNCs) of the EU. Both corridor concepts complement one another. The RFC-Regulation does not contain target standards for the railway infra-

structure of the corridors, but the TEN-T-Regulation defines minimum infrastructure requirements for the Core Network for freight (see Chapter 2) and the Connecting Europe Facility (CEF) provides funding for infrastructure investments in the TEN-T Network and the governance structures of the RFCs. Both will help to strengthen the attractiveness of the RFCs and the competitiveness of rail as a transport mode in both types of corridors. Table 1 compares the key characteristics of the RFC and CNC concepts.

Core Network Corridors (CNC)	Rail Freight Corridors (RFC)
Multimodal (rail, road, aviation, inland waterways and ports)	Rail transport
Passenger and freight traffic	Freight focus
Only Core Network lines	Core Network lines, Comprehensive Network lines and non-TEN-T lines
Mainly oriented at infrastructure	Mainly oriented at traffic operations and administrative processes
One EU Coordinator per CNC	Dedicated, permanent governance structure for each RFC
	One RFC in each CNC

Tab. 1: Key characteristics of CNC and RFC / Source: Author's adaption from the respective regulations

4 Establishment of the Orient/East-Med Rail Freight Corridor No. 7

The Orient/East-Med Rail Freight Corridor No.7 became operational on 8 November 2013, as the first of all freight corridors and slightly ahead of the deadline imposed by the RFC-Regulation.

The corridor links central Europe with the southeastern parts of Europe running until the Greek seaport of Piraeus. With the modification of the Principal Route through the CEF-Regulation in 2013, the corridor became extended in the north from its previous terminus in Prague (Czech Republic) to the German seaports of Rostock, Hamburg, Bremerhaven and Wilhelmshaven and in the south in Bulgaria to the Black Sea port of Burgas and to the Bulgarian-Turkish rail border at Svilengrad and in Greece to the seaport of Patras. These extensions became operational in November 2018. Figure 5 shows the corridor with these extensions included.

When the route of the Orient/East-Med RFC No. 7 was defined earlier European corridor concepts were taken into account, such as:

> The ERTMS Corridor E, which runs from Dresden to Constanta (common line from Dresden to Constanta).

> The TEN-T priority axis 22, which runs from Nuremberg and Dresden to Constanta and Athens (common line from Dresden to Constanta and Athens),

> The RailNetEurope (RNE) Corridor No. 10, which ran from Hamburg to Budapest (common line from Hamburg to Budapest) and RNE Corridor No. 9, which ran from Vienna to Kulata and Constanta as well as to Varna, Burgas and Svilengrad (common line from Vienna to Constanta and to Kulata, Burgas and Svilengrad).

Fig. 5: Map of the Orient/East-Med Rail Freight Corridor No. 7 / Source: RFC OEM (http://www.rfc7.eu/about_us)

With its route the Orient/East-Med RFC No. 7 covers one of the most important transport arteries connecting central Europe with the southeastern part of the Union with onward connections to countries beyond the EU border, allowing the establishment of strategic transit routes towards Turkey and via the Black Sea ports to the Middle East and further Asian economies – these routes are currently under development as part of the so-called Iron Silk Road – and via the Greek seaports to maritime trade routes with China and other countries in Southeast Asia.
Of all RFCs, the Orient/East-Med RFC No. 7 calls the most Member States to cooperate in a RFC: Czech Republic, Austria, Slovak Republic, Hungary, Romania, Bulgaria and Greece, and from November 2018 on also Germany.

The geographical extension of the corridor also means that the corridor connects with the majority of the other RFCs (RNE, 2018):

> With the Scandinavian-Mediterranean RFC No. 3 in Germany

> With the Baltic-Adriatic RFC No. 5 in the Czech Republic, Austria and Slovakia

> With the Mediterranean RFC No. 6 in Hungary

> With the North Sea-Baltic RFC No. 8 in Germany and the Czech Republic

> With the Rhine-Danube RFC No. 9 in the Czech Republic, Austria, Hungary and Romania[3]

> With the future Alpine-Western Balkan RFC No. 10 in Bulgaria

> With the Amber RFC No. 11 in Slovakia and Hungary

With several of these corridors, in particular with the future Rhine-Danube RFC No. 9, the corridor will have overlapping sections. This underlines the network dimension of the RFCs and the importance of good co-operation between RFCs.

In the Management Board of the Orient/East-Med RFC No. 7 the infrastructure managers ÖBB Infra, SŽDC, ŽSR, MÁV, GYSEV, CFR, NRIC, OSE and DB Netz (since November 2018) and one allocation body, VPE, cooperate.

Figure 6 shows the governance structure of the Orient/East-Med RFC No. 7, including the working groups established under the Management Board. Table 2 gives an overview of the main fields of competence of the different working groups, illustrating the wide range of tasks to be covered by the RFC.

3 The Rhine-Danube RFC No. 9 will be established by November 2020 and include the current Czech-Slovak RFC.

The Orient/East-Med RFC No. 7 is operating in a demanding business environment requiring flexibility to meet customer expectations. In quantitative terms capacity is not a major problem on the corridor, at least not in the short term; train paths are usually available even at relatively short notice. Due to this, railway undertakings often do not plan long ahead and path requests are therefore rather ad-hoc and made at short notice; this means that a capacity product in the form of pre-arranged paths is often less suitable for these customers and raises the question of introducing the possibility for much more short-term capacity requests.

In 2016 the longest requested path distance was 1644 km with an average of 1010 km per request (Orient/East-Med RFC No. 7, 2017: 23). This shows a clear interest in utilizing corridor capacity mainly for long-distance traffic – such as from Germany towards Turkey.

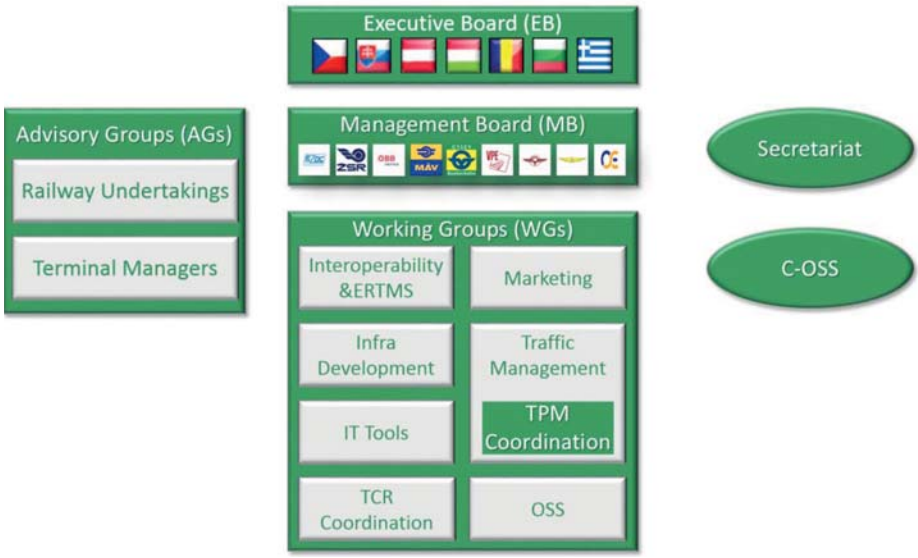

Fig. 6: Governance structure of the Orient/East-Med RFC No. 7 / Source: RFC OEM (http://www.rfc7.eu/summary)

Bottlenecks along the corridor are primarily of qualitative nature, e.g. low technical standards of infrastructure. Addressing this challenge, southeastern Europe currently faces the implementation of major infrastructure improvements with a focus on upgrades and refurbishments of railway lines and the proper implementation of the TEN-T minimum requirements. When finalized these will give a boost in capacity, efficiency and competitiveness of freight operations; however, during implementation the necessary work causes challenges in the form of temporary capacity restrictions (the coordination of which is one of the tasks of the RFCs). This problem is aggravated by the fact that the rail network in southeastern Europe is less dense and therefore the availability of diversionary routes limited. In the northern part of the corridor a new railway

link across the German-Czech border between Prague and Dresden will constitute an important enhancement for the corridor in the longer term. A further challenge is the adequate development of modern intermodal terminal and last-mile infrastructure.

Working Group	Leadership	Main fields of competence
Marketing WG	GYSEV	Transport Market Study, Satisfaction Survey, performance objectives and monitoring, definition of Pre-arranged Paths and Reserve Capacity, Non-RU Applicants.
Traffic Management WG	MÁV	Harmonization of traffic management in case of disruption, working out solutions and procedures for improving punctuality and reducing waiting times during train runs. Effective communication between TCCs. In the framework of TPM Coordination working together with concerned RUs in order to increase train performance on RFC No. 7.
One-Stop Shop WG	VPE	C-OSS operation rules, Corridor Information Document, definition of Pre-arranged Paths and Reserve Capacity, coordination of capacity-allocation between C-OSS, IMs, Terminals and Applicants.
Infrastructure Development WG	SŽDC	Investment Plan, inventory of projects and financial resources, harmonization of investments along the corridor.
Interoperability and ERTMS WG	ÖBB-Infra	Accelerating the establishment of better interoperability along the corridor and enhancing ERTMS deployment, ensuring consistency with ERTMS E corridor.
IT Tools WG	CFR S.A.	Identification of necessary IT tools, facilitating their introduction by every involved IM and AB.
Temporary Capacity Restrictions WG	SŽDC	Coordination of planned temporary capacity restrictions along the corridor.

Tab. 2: Main fields of competence of the working groups of Orient/East-Med RFC No. 7 / Source: Author

In collaboration with the CNC Orient/East-Med Core Network Corridor, the Orient/East-Med RFC No. 7 started a working group on 'cross border issues' in March 2016. The main focus of this cooperation is to reduce waiting time at border crossings. The Management Board prepared an Action Program to eliminate or at least reduce these bottlenecks and identified operational, technical and administrative measures. For successful implementation, the participation of railway undertakings is indispensable; close cooperation with railway undertakings has been launched.

According to the customer satisfaction surveys the areas in which the corridor is most successful are the path allocation and communication activities, while the weakest points concern the state of infrastructure. This confirms a continued need for improvements and freight-oriented investments in the network.

5 Achievements, effects and prospects for future development

With the establishment of the last three initial RFCs in November 2015 the corridors reached an important milestone in their development. The establishment of two further RFCs in central and southeastern Europe, the Amber RFC No. 11 and the Alpine-Western Balkan RFC No. 10, closes some gaps and finalizes for the foreseeable future the network of RFCs.

The RFCs are now entering into a new phase, leaving the phase of establishment and shifting their focus to continuous development in line with market and customer needs. The phase of operation of the corridors is still very short and it is still too early to draw final conclusions about their success. Nonetheless we can at least glimpse some developments and experiences which can give a hint of future developments and the corridors' possible impact.

One important aspect is the establishment of permanent structures as such, creating fora with strong legal backing for Member States, Infrastructure Managers, corridor users (railway undertakings) and terminals to jointly handle issues and problems affecting international rail freight on the different corridors. In the past, such issues often had to be raised by corridor users on a bi-lateral basis country by country, often with little impact. The RFC concept brings concerned stakeholders across borders to one table and dedicated expert staff with a solution-oriented approach can deal with the issues. This in itself constitutes an important value and achievement of the RFC concept and delivers benefits to all parties involved.

Experience from the RFCs shows that the corridors have established working groups which are dealing with many relevant issues raised by corridor customers, even if they are not explicitly mentioned in the RFC-Regulation. Such aspects include for example:

> Short-distance interoperability on border sections (e.g. operational language, vehicle authorization)

> Rules for buffer wagons in dangerous goods transport

> Terms and conditions for use of infrastructure

Also, different corridors have launched dedicated studies on various issues affecting the efficiency of rail freight, such as on the operation of longer freight trains (740m), loading gauge enhancements, last-mile infrastructure, etc.

We can today also see a growing offer and increased use of the dedicated capacity on the corridors; there are pilots with new, more flexible capacity products to better meet the expectations and needs of more customers. The RFCs with their international perspective and expertise are also contributing to a RailNetEurope-project concerning the redesign of the international timetabling process (TTR-project), which aims at more market-oriented processes for European timetabling.

At the same time, there are still challenges to overcome and there is certainly room for further improvement both in the work of the RFCs as well as in the RFC concept as such. The need for development of more market-oriented capacity products has already been mentioned; in this context, a strengthened and broadened role of the C-OSSs should be considered. Faster decision-making and faster implementation of solutions are also much desired by customers. The harmonization of operational rules, processes, terms and conditions and legal frameworks needs to be improved. When it comes to the removal of bottlenecks freight-oriented investments are needed, calling for stronger involvement and commitment by the Member States concerned in their investment planning. A stronger commitment by Member States is necessary in two fields: in the financing of freight-related infrastructure investment and through a more active role by state authorities in the harmonization of rules and legal provisions (which are outside the control of infrastructure managers and railway undertakings).

An important success factor for the RFCs will be strengthening the network dimension of the corridors. Trains do not usually operate within one corridor, but move between different corridors and may also start and/or terminate at places outside any corridor. A positive note is that corridors have already started close co-operation and set up joint fora on a voluntary basis to improve co-ordination between them, i. a. in the framework of RailNetEurope (RNE) and through a 'RFC Network' and the 'RFC High-Level Group' for exchange between the Managing Directors and the 'C-OSS Community' for the cooperation between Corridor One-Stop-Shops. On the customer side, network-wide cooperation is taking place within the ECCO-initiative under the umbrella of UIC, and on the Executive Board side a Network of Executive Boards (NExBo) has been established; also IRG Rail as the European cooperation forum of the Regulatory Bodies has established a working group dealing with RFC issues. Even between these different groups regular dialogue takes place.

Regarding the geography of the corridors, the aspect of better inclusion of diversionary routes into the corridors needs to be raised with a view to improving the resilience of the corridors. Some major disruptions on RFCs in the recent past have highlighted the importance of this. In the longer run even the idea of letting the RFCs play a broader role in dealing with issues of international rail freight, potentially covering all international rail border crossings, deserves attention.

An issue specifically concerning the Orient/East-Med RFC is the designation of lines. Today the line via Vidin – Calafat is designated as a main line of the corridor – though it is de facto dysfunctional – while the line via the Giurgiu-Ruse border crossing is only included as a diversionary route, though this is the line de facto used by international freight trains between Bulgaria and Romania. Also, the shorter line from Ruse to Dimitrovgrad via Gorna Orjahovica and Stara Zagora is not designated to the corridor at all.

Strengths	Weaknesses
> Permanent and strong governance structure with defined tasks and decision powers stemming from legal basis on EU level > Working groups under Management Boards with involvement of relevant stakeholders addressing specific issues raised by customers to facilitate usage of RFCs > Flexibility to adapt network of RFCs in line with market needs through extension of and establishment of further RFCs using a bottom-up approach	> Slow decision-making processes due to consensus requirement > Slow delivery of quick wins for customers > Inflexible capacity products > Very limited involvement of shippers and non-RU freight service providers > Lack of ambition levels by infrastructure managers and Member States > Lack of high-level support of and knowledge about RFCs within the organizations concerned
Opportunities	**Threats**
> Growing share of international traffic in European rail freight > Increased attractiveness of RFCs with new, market-oriented capacity products and services > Strengthened role of Corridor One-Stop-Shops > Realization of synergy effects through improved co-operation between RFCs > Cooperation with railway corridor organizations outside EU (e. g. along Euro-Asia land-bridge) to facilitate traffic across EU outer border	> Lack of freight-oriented investments into railway infrastructure designated to RFCs > Risk of RFC stakeholders losing interest in RFCs if they do not deliver tangible benefits quickly > Risk of weakening political support for RFC-concept due to changing policy priorities

Tab. 3: Preliminary SWOT-analysis of the RFC-concept / Source: Author

A specific challenge for the Orient/East-Med RFC No. 7 is to tap the huge unexploited potential in traffic with Turkey and traffic via the Black Sea ports and Greek seaports with Asia. Much of this traffic currently uses other routes and other modes of transport – especially by ferry via the Adriatic and Mediterranean Sea – but could principally go on the corridor, if better reliability, punctuality and efficiency of rail freight services could be ensured. This requires joint efforts by a high number of actors. In particular the following three areas need to be addressed:

1 Good infrastructure standard for freight, continuous over the entire length of the corridor (i.a. regarding train length and axle-loads)

2 Solving border crossing issues with a view to shortening dwell times in border stations (e.g. through the introduction of 'trusted trains')

3 Cooperation and coordination with stakeholders and countries beyond the EU border (Turkey, countries along the Iron Silk Road route; cooperation could be considered with the Euro-Asian OSJD corridors concerned)

An interesting situation will arise with the establishment of the Alpine-Western Balkan RFC No. 10. While railway networks are usually considered as natural monopolies, here is a case where RFCs (i.e. infrastructures) to some extent compete with each other regarding long-distance traffic (a similar situation exists e.g. between RFCs No. 1 and 2 for traffic between the ARA-ports and Switzerland(–Italy) or between RFCs No. 5 and 11 for traffic between the northern Adriatic and the Visegrad countries. Such competition could have a stimulating effect, triggering the willingness of countries to make investments. However, from a customer perspective it is also important that this competition is not at the expense of cooperation between RFCs. There is also still room for completion of the RFC network in the Western Balkan region: for the Alpine-Western Balkan RFC No. 10 an extension with the route Belgrade–Subotica–RS/HU-border should be considered in order to avoid a gap in the RFC-network. At the border, this new branch of RFC No. 10 would then connect to the Amber RFC No. 11.

It should be noted that the geographical development of the RFC-network now taking place in southeastern Europe and the above proposed additions are not fully geographically congruent with the proposed extension of the CNC-network in the Western Balkan region as tentatively identified in June 2015 by the Commission and the countries concerned (EC 2015, EC 2017b: 32-34). However, the extensions of CNCs proposed at that time contain a number of shortcomings from a rail freight perspective, the biggest being that the Nis–Sofia route is not included in any CNC at all, even though in terms of traffic volumes it is more important than the line via the Republic of North Macedonia to Greece. It remains to be seen to what extent the future extension of the CNC-network in the Western Balkans (the proposal from 2015 was tentative only) will follow the patterns now outlined by the RFC-developments.

Table 3 contains a preliminary SWOT-analysis of the RFC corridor concept; it should be noted that this analysis does not concern a specific corridor but is based on experience gained from the entirety of RFCs.

In conclusion, the RFC concept constitutes an innovative approach to the management of international rail freight and has initiated much stronger and closer cooperation of involved parties than previously existed. This has already delivered important initial benefits in the form of processes, new communication channels and concrete proposals for solutions, of which some are currently starting or will soon enter a test phase. This creates a good basis for the future development of the RFCs and impetus for further deepening the RFC model. Several ideas proposed in this paper are also supported by the outcome of the public consultation in the context of the evaluation

of the RFC-regulation by the Commission (EC 2016b). Strong commitment and high ambition levels for the development of the Orient/East-Med RFC No. 7 – together with other RFCs in southeastern Europe – offer the potential to strengthen competitiveness and better exploit the important market potential of rail freight in this part of Europe.

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